SPENCER KELLOGG ELEVATOR
(Schaefer Brewing)
(St. Mary's Cement)
389 Ganson Street
Buffalo
Erie County
New York

HAER No. NY-246

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WRITTEN HISTORICAL AND DESCRIPTIVE DATA
PHOTOGRAPHS

Historic American Engineering Record
National Park Service
U.S. Department of The Interior
P.O. Box 37127
Washington, D.C. 20013-7127

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HISTORIC AMERICAN ENGINEERING RECORD

SPENCER KELLOGG ELEVATOR
(Schaefer Brewing)
(St. Mary's Cement)
HAER No. NY-246

Location: 389 Ganson St., Buffalo, Erie County, New York

Date: Mainhouse: application for building permit filed November 11, 1909; approved November 22, 1909; completed during 1910 building season
Loading Bin:building permit issued June 10, 1912
Loading Elevator Addition: building permit issued December 12, 1936
Loading Elevator Extension: building permit approved April 19, 1923

Designer: Mainhouse: Chas. B. Foster, chief engineer & president, SS & ECC; concrete calculations by General Fireproofing Co., Youngstown
Loading Bin: Unknown
Loading Elevator Addition: Unknown
Loading Elevator Extension: H. R. Wait

Builder: Mainhouse: Steel Storage & Elevator Const. Co., Buffalo
Loading Bin: Unknown
Loading Elevator Addition: Unknown
Loading Elevator Extension: Monarch Engineering

Status: Mainhouse: Non-operational
Loading Bin: Operational as cement storage
Loading Elevator Addition: Operational as cement storage
Loading Elevator Extension: Derelict, workhouse demolished

Significance: The grain elevators of Buffalo comprise the most outstanding collection of extant grain elevators in the United States, and collectively represent the variety of construction materials, building forms, and technological innovations that revolutionized the handling of grain in this country.

Project Information: The documentation of Buffalo's grain elevators was prepared by the Historic American Engineering Record (HAER), National Park Service, in 1990 and 1991. The project was co-sponsored by the Industrial Heritage Committee, Inc., of Buffalo, Lorraine Pierro, President, with the cooperation

of The Pillsbury Company, Mark Norton, Plant Manager, Walter Dutka, Senior Mechanical Engineer, and with the valuable assistance of Henry Baxter, Henry Wollenberg, and Jerry Malloy. The HAER documentation was prepared under the supervision of Robert Kapsch, Chief, HABS/HAER, and Eric DeLony, Chief and Principal Architect, HAER. The project was managed by Robbyn Jackson, Architect, HAER, and the team consisted of: Craig Strong, Supervising Architect; Todd Croteau, Christopher Payne, Patricia Reese, architects; Thomas Leary, Supervising Historian; John Healey, and Elizabeth Sholes, historians. Large-format photography was done by Jet Lowe, HAER photographer.

Historians: Thomas E. Leary, John R. Healey, Elizabeth C. Sholes, 1990-1991

This is one in a series of HAER reports for the Buffalo Grain Elevator Project. HAER No. NY-239, "Buffalo Grain Elevators," contains an overview history of the elevators. The following elevators have separate reports:

NY-240 Great Northern Elevator
NY-241 Standard Elevator
NY-242 Wollenberg Grain & Seed Elevator
NY-243 Concrete-Central Elevator
NY-244 Washburn Crosby Elevator
NY-245 Connecting Terminal Elevator
NY-246 Spencer Kellogg Elevator
NY-247 Cooperative Grange League Federation
NY-248 Electric Elevator
NY-249 American Elevator
NY-250 Perot Elevator
NY-251 Lake & Rail Elevator
NY-252 Marine "A" Elevator
NY-253 Superior Elevator
NY-254 Saskatchewan Cooperative Elevator
NY-256 Urban Elevator
NY-257 H-O Oats Elevator
NY-258 Kreiner Malting Elevator
NY-259 Meyer Malting Elevator
NY-260 Eastern States Elevator

In addition, the Appendix of HAER No. NY-239 contains brief notations on the following elevators:

Buffalo Cereal Elevator
Cloverleaf Milling Co. Elevator
Dakota Elevator
Dellwood Elevator
Great Eastern Elevator
Iron Elevator
John Kam Malting Elevator
Monarch Elevator
Pratt Foods Elevator
Ralston Purina Elevator
Riverside Malting Elevator

The Spencer Kellogg site developed about the Wadham Slip, a waterway that communicated between the Buffalo River and the ship canal immediately to the south of Michigan Street. The slip was truncated in the 1890s by the laying out of Ganson Street, leaving only its easterly portion to make a junction with the Buffalo River. By the second decade of the century, all three sides of the slip, now known as the Kellogg Slip, were flanked by buildings of the Spencer Kellogg complex.[1]

The Coatsworth Elevator appears to have been the earliest elevator built along the slip. It was a relatively small wood crib-binned elevator on the north side of the slip close to the junction with the Buffalo River. The Spencer Kellogg complex began to develop on the opposite, southern side of the slip. In the early 1890s the company built a wood crib-binned elevator on the side of the slip close to the river. Although the elevator appears in the 1894 Buffalo Merchant's Exchange listings, it is not depicted on the 1889 Sanborn Map. The elevator had a capacity of 600,000 bushels, a two-story flat-roofed cupola above the bins and two marine towers. In 1893, the Coatsworth Elevator burned down. The following year it was replaced by larger facility.

The new Coatsworth Elevator extended along the north side of the slip to the junction with the Buffalo River. The elevator had wood crib bins accommodating 650,000 bushels and featured a classic high cupola along the length of the building. It was equipped with two marine towers. In 1903 a new five-story, brick linseed oil mill was built along the slip to the west of the Kellogg Elevator. Sometime during the first decade of the century, the Spencer Kellogg Company acquired the Coatsworth Elevator, which became known as the Kellogg "A" Elevator; the original Kellogg Elevator became the "B" Elevator.

In 1909, when the company planned to increase and update elevating capacity, it chose the new medium of reinforced concrete to build an elevator on the site of the Coatsworth Elevator. The elevator was designed not only to serve the on-site milling activities of the Spencer Kellogg Company, but also to provide a transfer facility for its New York milling operation. With the anticipated opening of the enlarged New York State Barge Canal in 1915, it was intended that such transfers be made by this route, and with this in mind the main bins were designed to store barge load lots of 35,000 bushels. The original Kellogg Elevator was retained for some years afterward and, upon completion of the new elevator, became known as Spencer Kellogg "B" Elevator.

The elevator measures 283'-4" x 56'-8" and runs east-west along the site of the now infilled Kellogg Slip. The work was

undertaken and completed during the 1910 building season by the Steel Storage & Elevator Construction Company (SS&ECC) of Buffalo and was apparently its first venture into the field of concrete bin construction. The elevator was designed by Charles B. Foster, chief engineer and president of SS&ECC. The detailed concrete calculations were made by the General Fireproofing Co. of Youngstown, Ohio, which appears to have supplied the reinforcing bars. The elevator is notable in being only the second in Buffalo to employ outerspace pocket bins between the exterior walls of the main bins. The particularly spacious basement accommodated railroad loading and unloading facilities directly below the bins. The Spencer Kellogg "B" is the only known example in Buffalo of a concrete elevator retaining such arrangements, which were common in wooden elevators. The basement was built using conventional fixed form techniques.

The bins were raised by slip forming in a single lift. The forms were 4′ deep and constructed of timber staves fastened to circumferential built up timber rings. The forms for any one bin were rigidly connected to those of adjoining bins. To ensure that the forms were raised evenly, a 4" x 1" vertical strip was fastened to the face of the forms in every main bin. The 1/2" groove that this timber formed in the bin wall served as a guide. The forms supported a working platform for the storage of construction materials and the distribution of concrete.

The working platform was not supported by I-beams incorporated into the structure of the bin floor, but by substantial timber-trussed beams under the working platform. The inner and outer forms were held together by steel yokes that incorporated the jacks for raising the forms. The jacking system appears to have been a derivative of the James MacDonald system in which screws were rotated by lever-operated ratchets. In this case, a solid 2′ long screw jack was attached to the yoke and turned by a capstan nut. The base of the screw bore on the top of the jacking rods set into the wall. The jacking rods were short, 1′ lengths of 1" rod connected by sleeves. When a jack was extended to its full length, it was backed off to allow a new section of rod to be added below. By using 1′ lengths of rod and 2′ long screws, the connections between the jacking rods could be staggered so that only half of the jacks reached their full extension at any one time. The remaining jacks supported the forms while the jacking rods were extended. The forms were raised in 1/4" increments and the concrete was placed continuously in 6" lifts. Each lift took about 2-1/2 hours to place, and the bin walls rose at an average of 4′ per day.

Concrete was mixed on site using a Koering one yard mixer, supplemented by a batch mixer when large volumes of concrete were required. Fifteen thousand cubic yards of concrete and about 140

men were required to complete the elevator. The estimated cost of construction was $225,000; the elevator provided storage at a cost of 22 cents per bushel.

The elevator could store 1,000,000 bushels in its twenty main bins, eight interspace bins and twenty outerspace bins. The main bins are arranged in two parallel non-interlocking rows of ten bins with a total capacity of 39,000 bushels. The bins are cylindrical, have an inner diameter of 26'-8", and are placed in tangential contact on 28' centers. The eight interspace bins are in a single row occupying the interstices between the two rows of main bins. The ninth central interspace is occupied by a lofting leg and is not available for storage. The interspace bins have a capacity of 11,700 bushels. The outerspace bins between every main bin have convex outer walls of the same circumference as the main bin walls. As the bins are in tangential contact, the outerspaces are very small, and the outer walls are only one-sixth the circumference of the main bin walls. The outerspaces have a capacity of 3,500 bushels.

The bins rise to a height of 85' above the bin slab, with tangential thickening extending 4' to either side of the bin center lines. The bin walls are 8" thick, except in the tangential thickening, where the minimum thickness is 16". The tangential contact appears to accommodate some form of keyed connection between adjacent bin units. The precise details of this apparently unique structural feature are uncertain, though each contact has five keys placed on 18" centers. Similarly, the outerspace exterior wall appears to be keyed into the main bin wall with provision made for differential movement between the two. The verticals in the main bin walls are centered 6" behind the exterior face of the wall, while those in the outerspace wall are positioned in the center. This arrangement is necessary so that the keying can be accommodated within the main bin walls. A 1:2:4 concrete mix was employed in the construction of the walls.

The vertical reinforcing consists of square lug bars on 18" centers in both main and outerspace bins. Each main bin has fifty-six verticals supplemented by an unknown number of jacking rods, usually eight. The density of verticals is much greater than would become the case during the second decade of concrete bin construction. The verticals are 8' long with 6" lapped wire connections between successive bars. The jacking rods are of 1" rod spliced together by sleeves at 1' intervals. The horizontal steel is designed to bear 16,000 psi of tensile strain and is arranged in graduated 12" courses. Each course consists of three, 30' lengths of non-deformed rectangular bar, which overlap by 2' and are wired together to form a single tank band. Within the main bins, the tank bands diminish in size upwards from twenty-five courses in the first 26' of bin wall to ten courses

in the upper 10′ of bin wall.

Like many other early concrete elevators, the Kellogg Elevator employs more sizes of horizontal reinforcing bars to produce finer course graduations than would be the case in elevators built over the next decade. The exterior wall of the outerspace bins is uniformly reinforced with square lug bars in 12" courses that conform to those of the main bins. These bars are 17′ long and have hooked ends. The hooked ends are attached to separate anchor bars bent behind the main bin vertical at the intersection of the main and outerspace bin walls. All horizontals are wired to the outside of the verticals.

The main bin hoppering is provided by 16′ x 16′ flat-plate steel hoppers at 50˚ angles, which bear upon the network of longitudinal and transverse basement beams. Towards the edge of the bins, the hoppering is provided by mortar-faced slag concrete placed on the bin floor. This hoppering has four faces sloping into the main steel hoppers. The interspace bins discharge slightly asymmetrically toward the side of the basement accommodating the conveying system. The hoppering is provided by mortar-faced slag concrete placed on the bin slab. The hoppering has four slab faces which direct grain to a single steel draw-off spout set within the bin slab. The outerspace bins have a mortar-faced slag concrete hopper placed on the bin slab. It is comprised of a single slab that directs grain to a draw-off spout located close to the inside edge of the bin.

The basement provides a full height of 19′ below the basement beams and lies above ground level. This exceptional basement height permitted the entry of railroad cars directly below the bins. The Kellogg Elevator is the only concrete elevator in Buffalo to feature such an arrangement. By this date, it was more usual to exclude such dusty loading and unloading operations from the main storage unit and confine them to an attached loading shed. Three rows of bracketed rectangular pillars rise from the longitudinal foundation footings to form a basement two bays wide. The landward bay accommodated a railroad loading/unloading track and the slip side bay the horizontal conveying equipment. The outer row of pillars is infilled with rusticated concrete blocks to form the basement exterior wall. The rusticated panels are pierced by large upright windows. The pillars rise 21′ above the floor slab and extend through the slab 4′-9" to the top of the foundation column footings. Outer pillars measuring 6′ x 2′ are placed about the point of intersection between the main and outerspace bin walls. They were designed to carry 800,000 pounds and are reinforced with fifteen vertical rods of 1-3/4" diameter. The inner row of 8′ x 3′ pillars supports the very edge of the tangential contact thickening from which it extends below the interspace bins. The bins, designed to

carry a load of 1,282,000 pounds, are reinforced with thirty vertical rods of 1-3/4" diameter. All pillars are arranged with their longest sides running longitudinally.

The basement pillars support a network of longitudinal and transverse basement beams. The longitudinal beams extend along the line of the pillars; the inner beam is 3′ square, while the outer beam is 3′ x 2′. The span of these beams is 6′ and 6′-4", and they are reinforced with three herringbone bars, three 1" lug bars and two 3/4" lug bars. The transverse beams are located above the extremities of the pillars so that they run below the bin walls mid-way between the points of tangential thickening. The beams are 6′ x 3′, with a span of 24′-6". Eight trussed and nine straight 1-1/4" lug bars installed in the base of the beams allow them to withstand 285,000 pounds of shear. The transverse beams support two sides of the hopper bottoms, and the remaining sides are supported by supplementary longitudinal beams. These 2′ x 1′ beams have a span of 16′ and are reinforced by three 1" and three 1-1/2" herringbone bars. They are supported by two main transverse beams below each bin.

This arrangement of basement beams differs from that of the contemporary Wheeler Elevator and the earlier American and Perot elevators. In these structures, the beams are arranged on an octagonal plan so that the bin wall lies directly above and is supported by the beams. A partial bin slab had to be introduced into this design to support the bins of the Kellogg Elevator. The bin slab is carried by the network of basement beams and extends between all beams except those supporting the main bin hopper bottoms.

The elevator is built on 2,232 wood piles driven to bedrock and placed on a 2′-4" center to withstand a load of twenty-five tons. The basement arrangements of the elevator permit some economy in the foundation works. Although the basement beam elevators with an octagonal network of beams require overall piling and foundation slabs to support the greater number of basement pillars, the linear arrangement of the pillars in the Kellogg Elevator permits the concentration of foundation works into three linear column footings. Piling is only necessary below the column footings. The footing below the central row of pillars is 19′-6" wide and that below the outer row of pillars is 9′-6" wide. The footings are 4′-6" deep and their sides taper up so that the top of the center footing is 7′-6" wide and that of the outer footings 4′ wide. The footings are reinforced by a lower system of transverse lug bars, ranging in size from 1/2" to 1-1/4" and arranged on 4" centers within the central footing and 8" centers in the outer footings. An upper longitudinal system is designed to counter any bending moments generated between columns as a result of their differing bin loads. Within the central

footing, this system consists of six 1" lug bars on 6-1/2" centers; three of the bars are trussed and three are straight. To prevent lateral displacement between the footings, transverse tie-beams are placed between all columns. The tie-beams are located immediately below the floor slab where the columns extend down to the footings. The ties below the railroad bay are 4'-4" deep, and those below the conveyor bay are 2' deep. They are reinforced by trussed lug and herringbone bars. The area between and above the footings is infilled with gravel and capped by a 5-1/2" thick floor slab.

The bin floor 110' above the foundation is a 4" concrete slab resting on I-beams and reinforced with No. 12 expanded wire. The bin floor extends beyond the bin line to form substantial overhanging straight-edged eaves. A two-story gallery extends the length of the building, but only covers the central 22' of the bin floor. The lower floor of the gallery was designated as the lower distribution floor, and the top floor as the upper shipping floor. A workhouse with sloped walls and a pitched roof extends to a height of 172' above the center of the building. This structure accommodates four additional floors above those of the gallery--a scale floor, a garner floor, a bridge floor and a head floor. Both gallery and workhouse are of structural steel clad in corrugated iron. A conveyor gallery from the top of the workhouse to the opposite side of the slip also dates from 1910. The gallery is 167' above water level and has a clear span of 146'. As originally constructed, it terminated in a steel pylon that does not appear to have accommodated any elevating or spouting equipment. The elevator was equipped with two movable marine towers 32' x 22' and 150' high. These were of structural steel clad in corrugated iron and had pitched roofs.

When the Kellogg "B" Elevator was demolished in 1912, some of the timbers were probably used in the construction of the Wollenburg Elevator the same year. The clearing of the elevator permitted the completion of the overhead gantry across the slip. A single, free-standing, cylindrical concrete "loading bin" was substituted for the pylon and provided the southern terminus of the gantry. The bin was 23' in diameter and 160' deep. It was, together with the additional 1936 bins, the deepest bin constructed in Buffalo. The bin walls featured prominent horizontal lift breaks, suggesting that shifting panels were used, rather than slip forming construction techniques. It is apparently the only example of this form of bin construction in Buffalo.

Shifting panel construction did not involve the continuous pouring of concrete; rather, concrete was placed in discrete lifts and, once sufficiently set, the form work was moved upward to receive the next lift of concrete. To speed operations, double

or triple sets of panels came to be used. The panels were shifted in turn over each other. When concrete had been placed in the uppermost set of panels, the lowest set of panels, now containing set concrete, was elevated above the others in preparation for the next lift. The 160′ high Kellogg Loading Bin of 1911 shows the prominent horizontal lift breaks characteristic of shifting panel construction methods and is apparently Buffalo's only example of this type of work. The precise details of the forms used in its construction are not known.

By the second decade of the century, a number of engineering companies were marketing patented forms for the construction of circular storage bins. Such methods appear to have achieved some popularity in the construction of small "country" elevators where slip forming methods found less favor due to the complicated logistics of continuous pouring. Most systems featured steel form work, the design of which saved time in "raising and placing" and produced work that was "true to size and perpendicular." The various systems sought to eliminate the need for scaffolding to the full height of the structure, and featured means by which the panels could be manipulated with ease by a minimal labor force.

The steel forms supplied by the McCoy Company were in upper and lower sets supported by staging arranged within the bin walls. More innovative designs used similar sets of forms but employed a steel mast centrally placed within each bin. The mast supported both a derrick by which the forms could be lifted and the working platform from which the forms were manipulated and the concrete poured. This system eliminated the need for conventional staging.

The basic design was developed into a movable form in which a single form set, together with working platform and all equipment, was supported from the central mast. The entire structure was lifted by a vever jack which bore on a casting pinned to the mast. It does not appear that slip forming was carried out using these forms; rather, concrete was poured in discrete lifts and left to set before the forms were moved. Most forms were built to erect bins of one diameter. However, the Blaw Steel sectional form appears to have been particularly popular, as it could readily be adjusted for various bin diameters. The system consisted of a double set of forms each about 2′ deep. The forms were made up of individual 18" long panels of sheet steel. The panels slotted and locked into a system of 6′ long upright channel bars arranged on 18" centers about the circumference of the bin. Diameters could be altered by adding or subtracting these panels. At any one time the channel bars contained both upper and lower panels and had sufficient length remaining to accommodate the next shift of panels. As building work progressed, the channel bars were raised in 2′ increments to

accommodate the next shift of panels. No scaffolding was required in this form of construction, as work was carried out from temporary staging placed across the bins. The panels appear to have been manipulated by hand.

In 1923 the single loading bin on the south quay was augmented by the construction of a "Loading Elevator" on the site of the original wooden Kellogg Elevator near the junction of the slip and Buffalo River. This elevator, designed by H. R. Wait and built by the Monarch Engineering Company, appears to have been the last in Buffalo to use steel storage bins. The elevator's capacity of approximately 155,000 bushels is contained in four cylindrical main bins and one interspace bin. The main bins, 20' in diameter and arranged in a square of two rows of two bins, are spread to provide a single large interspace bin between the four main bins. The link wall between the main bins is formed by a convex exterior wall plate connecting the bins at their closest points. The bins are 65' deep and rise from a full height basement of reinforced concrete.

The basement concrete bin slab is supported by tiered, rather than mushroom-headed, columns. The area between the exterior columns is infilled with brick panelling. The elevator is on wooden piles. A steel-framed corrugated iron workhouse rises above the bins to a total height of 140'. It provides shipping facilities to the adjacent railroad loading shed. The loading complex also included ten small freestanding steel tanks about 9' in diameter and a freestanding steel tank approximately 20' in diameter. All rose directly from the foundation slab and were located between the 1922 steel loading elevator and the freestanding concrete bins of 1912 and 1936. The date of their construction is unknown.

In 1936 a building permit was issued for an addition to the loading elevator. Three freestanding cylindrical loading bins were built adjacent to the single bin of 1912. Although also 23' in diameter and 160' tall, these bins have a smooth exterior finish suggesting slip form construction methods. Today, the complex is used for cement storage. The marine towers have been demolished, but the workhouse and the four 160' loading bins remain intact. The 1922 steel elevator is derelict and deprived of its workhouse. All other structures on the site have been demolished.

BUSINESS HISTORY

Spencer Kellogg & Sons was one of Buffalo's paramount grain elevating and processing companies. Unlike most of its counterparts on the Buffalo River, the Spencer Kellogg facility

did not handle raw grains for foodstuffs or mill flour; rather, the company concentrated on the processing of non-comestible vegetable oils, particularly linseed, which were used in a variety of products. The company existed in Buffalo from 1879 to 1961, growing from a modest one-man operation to become a diversified international enterprise operating in eight states and several foreign countries. Its raw materials were drawn from China, the Philippines, Latin America, India, and the grain belt of America. Despite its far-flung interests, the headquarters was always maintained in Buffalo, and the company was always under family control.

The Kellogg family business began in Amsterdam, New York, where Spencer Kellogg's great-grandfather, Supplina Kellogg, founded a small linseed oil operation. In 1878 Supplina Kellogg continued the oil business but moved to Des Moines, Iowa, where he tried his hand for one year as a private banker. Despite the elder Kellogg's absence, the linseed oil business flourished, and upon Supplina's return, the company relocated to Buffalo in 1879 to expand its new grain by-product operations.[2] During the early years in Buffalo, the firm was known as Kellogg & McDougall and maintained a variety of operations including a broom and brush manufactory. The linseed oil works was located on Ganson Street at the intersection of South Michigan, the future site of the company's large elevator and mill. Another smaller linseed oil aging operation was on Elk Street. The company also manufactured white lead paint, varnishes and paintbrushes.[3]

The Spencer Kellogg Company, led by Supplina's grandson Spencer, was formally incorporated in 1892. The incorporators included Sidney McDougall, Kellogg's original partner in the old firm, and three additional men drawn from both Kellogg & McDougall and Kellogg Oil, Paint & Varnish Company. Each of the five men had twenty shares in the new company, which carried an authorized capitalization of $100,000 issued in 1,000 shares with a $100 par value. The company filed a certificate of dissolution seven years later, and little is known about its short existence.[4]

The specific reasons for Spencer Kellogg's dissolution are not known, but the late 1890s marked the era known in business history as that of the "great merger movement." Protective tariffs covered a variety of commodities including linseed oil, and aggressive companies moved voraciously to dominate such lucrative sheltered operations by absorbing small companies to create giant monopolies. The major linseed combine, backed by Rockefeller interest, was American Linseed. This giant trust was created in two stages; the weakening of American's major competitor, National Linseed in 1896, was followed by the

strengthening of American Linseed in 1898 and the settlement of non-competition agreements between the two giant trusts in 1899. Every linseed oil manufacturer not already a part of either trust was in danger of being absorbed or put out of business. One of the few remaining independent firms, Spencer Kellogg may have dissolved itself as a business entity in order to eradicate all of its stock shares available for sale, thereby foiling any attempts at takeover by National or American.[5]

Although American Linseed could not acquire Spencer Kellogg, it continued to represent a threat. In 1900 American Linseed suddenly appeared on the Buffalo River when it secretly purchased the large Eastern Elevator at a foreclosure sale. The agent for the trust, Buffalo Attorney Herbert P. Bissell, did not reveal the new owners' identity or the fact that their expansion plans could seriously jeopardize local oil manufacturers, particularly Kellogg. American Linseed already owned the National Linseed properties (part of the non-competition settlement), which included an elevator adjacent to the Eastern. With American owning two nearby linseed facilities, Kellogg's future appeared in jeopardy.[6]

The first federal prosecutions under the 1895 Sherman Antitrust Act did not occur in earnest until 1902, but there was a growing public awareness and condemnation of the merger movement. Public scrutiny of efforts by giant companies to restrain trade coupled with one successful antitrust case in 1899, had begun to curtail giant trusts' most overt aggressions against smaller companies. A small but growing pool of survivors withstood the onslaughts from monopoly forces. In 1905, when American Linseed had forced three other Buffalo linseed manufacturers out of business, Spencer Kellogg remained intact.[7]

In May, 1904, Spencer Kellogg again incorporated, declaring its intention to produce not just a variety of agricultural products (the usual grain millers' catch-all phrase) but, specifically, to manufacture oils and their by-products. This time Kellogg declared its capitalization at $1 million, which was consolidated in the hands of three Kellogg family members--Spencer Kellogg and his sons, Spencer, Jr. and Howard. By 1906 when they declared their intention to acquire a $2.5 million mortgage secured by company bonds, the three required stockholders authorizing approval for the loan were still the original three men who continued to control virtually all of the outstanding stock. In this manner, the company continued to insulate itself from unfriendly merger or takeover attempts and to do business without outside influences.[8]

Once the merger movement ended, the dominant firm or firms

could and did end price competition, choke off entry of new firms, and dominate raw materials supply. Ironically, the consequences to smaller surviving firms were beneficial; tolerated by the trusts, they reaped price-hike advantages and could develop market niches more easily than if there had been significant competition from other small firms. Free from rivalry, operating outside the trusts' orbit of control and relatively prosperous financially, firms that endured did comparatively well.[9] Spencer Kellogg appears to have been one of these surviving smaller firms. By 1907 it voted for a supplement on its outstanding $2.5 million mortgage. This burst of corporate affluence indicates the overall good health of the firm, which was not belied by the company's 1910 downsizing. At this point, the company reduced its capital to only $500, but declared that it had no debts, an outstanding attribute for an expanding enterprise.[10]

During the following two-year hiatus while the company was virtually non-existent financially, the Spencer Kellogg Linseed Oil Company built its largest elevator across from the existing linseed oil plant, already the largest in the world. Completed in 1911, the elevator had a capacity of 1 million bushels of flaxseed. The elevator established Buffalo as the absolute center of Kellogg's manufacturing activity. The elevator was built to take advantage of the anticipated opening of the New York State Barge Canal scheduled for completion in 1915 and to accommodate the large, 1,000-ton barges destined to ply the canal between Buffalo and New York City. Each bin of the elevator could completely empty the 35,000-bushel capacity of three barges and could unload three barges simultaneously. In addition, surplus capacity could be routed to Kellogg's New York City mill at the eastern terminus of the canal.[11]

In 1912 the firm was again reorganized, this time as Spencer Kellogg & Sons, Inc. (SK&S). The new version of the company was guided by the three family members but capitalized at $6 million. The stock was again established at a par value of $100, and all 60,000 shares were owned by the family. By 1920 the Kelloggs' expansion efforts had paid off handsomely. SK&S was a national presence in the vegetable oil processing field. When Spencer Sr. died in 1922, his obituary revealed the extent of the company's operations. In addition to its central operations in Buffalo, SK&S had established branch enterprises in Minnesota and New York City with plants in Wisconsin, New Jersey, the Netherlands, Belgium, and South America.[12]

At the elder Kellogg's death, son Howard assumed the presidency. He had been actively involved in company affairs since 1903 when he was just twenty-two years old. During World

War I, Howard had served on Herbert Hoover's Food Commission, and would serve again during the Depression as a member of the Code Authority on linseed oil manufacturing for the National Recovery Act. These positions reflect both Howard's own well-regarded reputation within the industry and that of the company. Under Howard Kellogg's direction, the company diversified its product line. World War I petroleum shortages had prompted the industry to expand the types of vegetable oils suitable for use as both industrial lubricants and as substitutes in tanks, planes, trucks, and guns. Food shortages had provided the same incentive to pursue the development of butter substitutes, which SK&S did with its early versions of oleomargarine, a commodity produced exclusively in Buffalo.

Howard Kellogg also expanded the base of corporate control at SK&S by adding two outside directors who were also not part of the family. Kellogg's enlargement of the Board of Directors reflected the company's growing ties to the greater Buffalo business community. Frank C. Trubee, Jr., one of the first outside directors, came from the investment security firm of Baker, Trubee & Putnam and joined SK&S in the late 1920s. During the Depression, the company added George F. Phillips, an attorney with the Buffalo law firm of Kennefick, Cooke, Mitchell & Bass. Phillips was also a director of Marine Midland Bank. These additions to the board improved SK&S's access to capital, which was important during the lean years of the agricultural and general depressions of the late 1920s and 1930s. The presence of "outsiders", however, in no way diluted family control over the corporation.[13]

The company moved cautiously with respect to enlarging the role of non-family directors. Outside directors were not added to the board until after World War II. Walter Lindsay, a partner in the Buffalo law firm of Dudley, Stowe & Sawyer, joined SK&S in the late 1940s. In the 1950s Charles M. Kennedy joined the board providing Kellogg's first tie with another grain trader. Kennedy was secretary of Charles M. Kennedy Co., a commission grain brokerage, and was also on the board of Superior Grain Elevator Company, the nearby elevator operation C. M. Kennedy Co. had merged with in 1952. Besides these limited influences, all other directors who were not members of the Kellogg family were long-time employees with strong company ties and unquestioned loyalty. Kellogg's first half-century of survival had depended on its ability to withstand corporate takeovers, and the lessons of the past appear to have been well-inculcated in the post-war generation.[14]

The insularity of ownership was reinforced by the establishment of the Kellogg family trust created by Spencer, Sr.

just prior to his death in 1922. For years the trust was the primary beneficial owner of SK&S stock. Coupled with family dominance on the Board of Directors, the trust assured that both ownership control and management control would be vested in family hands. This security gave the company enormous flexibility to expand or retract its business operations. Without large blocks of shareholders to make demands for immediate returns on their investments or outside directors seeking to maximize their own profits at Kellogg's expense, the vegetable oil company could wait out hard times and husband its resources more closely.[15]

The trust was managed by Edward H. Letchworth, a prominent attorney with Kennefick, Cooke, Mitchell, Bass & Letchworth. He was also counsel to and vice-president of Marine Trust (later Marine Midland) Bank. In 1930 Letchworth became a director of Superior Elevator and Forwarding Company and, five years later, was a director of its successor company, Superior Grain Elevator as was Charles Kennedy. Unlike Kennedy, however, Letchworth was not a Kellogg director, so there was no overt conflict of interest. It is unclear why the Kelloggs maintained such close ties to Superior, even through these indirect channels, but there is no evidence of any business arrangements between the two companies.[16]

During SK&S's middle years, the company placed even greater emphasis on diversification and expansion. Before World War II, it had enlarged the operations in Buffalo and extended the search for raw materials worldwide. It obtained copra for coconut oil in the Philippines; tung oil used in waterproofing varnishes was manufactured in their Hankow, China plant; castor beans, the basis for castor oil, came to SK&S from Brazil, sesame seeds from Manchoukuo, and a fair percentage of its flaxseed for the mainstay product of linseed oil from Argentina. These raw materials arrived at the Ganson Street elevator to be processed exclusively at the adjoining mill in Buffalo.[17]

In addition to the lines of vegetable oils, SK&S had built a remunerative business in by-products and product residues. Oil cake dregs left after flaxseed processing were sold as cattle feed. Other by-products were used in manufacturing plastics for autos, leather substitutes, ink, and even bread. The company led the field in substituting one kind of oil for another, a skill it had begun developing during World War I. Its innovation and preparedness stood it in good stead at the outbreak of World War II because traditional sources of raw materials were abruptly eliminated when the Japanese invaded Manchuria. With the opening of hostilities, the Chinese tung bean supplies were eliminated, and SK&S rapidly ascertained that castor oil could be substituted

for tung oil with some modification.[18]

The company's foresight in erecting a superior research and testing operation in Buffalo made much of the adaptation possible. Headed by Dr. Alexander Schwarcman, the laboratory was responsible for a number of product adaptations and innovations that benefitted the entire vegetable oil industry. Schwarcman's centrality to the company's operations made him not only a valued employee but also a member of the board of directors.

By 1940 SK&S had incorporated its own steamship line in Buffalo and Delaware, which greatly improved the company's ability to buy and sell products worldwide. Following the war, Schwarcman extolled the foresight of the company's integrated business operations, which through the expansion of sales of novel products during the war, had made SK&S a $100-million-per-year business.

> Our raw materials...come from the four corners of the world. To get them our company owns its own tankers which take out to the Orient molasses and petroleum in exchange for copra, tung nuts, and flaxseed.

Spencer Kellogg & Sons was a truly international operation.[19]

Internally, Spencer Kellogg & Sons had reorganized itself several times prior to World War II. It reduced the shares of stock issued, realigned divisions and subsidiaries, established centralized control over the sales company, and effected a merger between the parent company and Kellogg Grain & Elevator Corporation. Its manifest charter objectives, first established in 1912, were diversified to include non-manufacturing businesses such as real estate development, franchising, trading in securities and other negotiable paper, etc. These changes all reflected the company's expansion and diversification, indicating financial good health.[20]

But the structural reorganization and product line expansion did not last. In March, 1948, despite the company's basic affluence, a worldwide shortage of flaxseed forced SK&S to shut its Ganson Street Elevator. The previous year linseed oil had become increasingly difficult to manufacture on a regular and predictable basis, and SK&S began a pioneering movement into soybean oil production. It built a new processing facility specifically for soy products in Bellevue, Ohio, a decision that may have been a bellwether for the Buffalo plant. The older facility was still dedicated exclusively to the manufacture of linseed oil, an increasingly difficult commodity upon which the company could rely.

As the company developed other oil products, it built plants closer to the raw materials. A cottonseed plant was constructed in El Centro, California, and the Long Beach, California, plant was rehabilitated to contribute to this new production process as well. By 1951 the Buffalo plant and its allied elevator had finally been adapted to handle more soybean processing, a decision that would not prove advantageous.[21] Buffalo was not well located to become a successful manufacturer of soybean products and oils. The plant was farther from the soybean fields than most others and therefore incurred greater transportation costs.

SK&S elected not to rehabilitate the Buffalo operation to handle the remaining "exotic" oils. In January, 1952, just two months after receiving a laudatory article in the local newspaper, the plant and the elevator were on the auction block. Buffalo had been surpassed by the Ohio soybean operations and other, more modern SK&S linseed facilities. Without extensive renovations, the Buffalo plant could not keep abreast of new internal company pressures. The capacity quickly became "surplus" within the corporate structure.[22]

SK&S soon closed the forty-year-old elevator and its mill, leasing the former to the Farm Bureau Co-operative of Columbus, Ohio for wheat storage. In April, 1954, the elevator was sold to another Buffalo Company, George J. Meyer Malt & Grain, a large eastern malting company with other Buffalo operations. At the time Meyer purchased the elevator, the company was doing business as Frauenheim Malting, so named for the Meyer sons-in-law who had assumed control of the family company.[23]

The parent company only survived for another seven years. In 1957 SK&S acquired Beacon Milling Co. of Cayuga, New York, an animal feed manufacturer based in New York, Pennsylvania, and Virginia. SK&S expanded its research operations to a new facility in a Buffalo suburb, and the company pursued a broad diversification and acquisition program including taking over a poultry feed operation in Kansas City, Missouri, and becoming the financial backer for a large poultry conglomerate based in Delaware. The relationship between SK&S and the poultry operations was a pioneering example of contract farming; in exchange for financial backing, the farmer purchased all the feed from SK&S. Unlike later companies such as Tyson and Purdue, SK&S was not successful in truly cornering the market.[24]

Despite some setbacks, SK&S remained essentially healthy financially, and its sound fiscal practices made it a tempting target for early corporate raiders. In July, 1961, SK&S fell under the control of multimillionaire Royal Little, head of the

Rhode Island-based conglomerate, Textron, Inc. Textron purchased SK&S for $29 million, which was below book value for the Buffalo company's stock evaluation. It is not entirely clear why the Buffalo oil producer sold out to Textron, but it may have been the family's desire to leave the business while it was still strong. At the time of the sale, SK&S Chairman Howard Kellogg defended the sellout at below market value and reassured other family members and business allies that Textron would never remove Spencer Kellogg & Sons from the Buffalo headquarters. He was wrong in both cases.[25]

The impact of the Textron acquisition on SK&S was unfavorable. First, the 150 members of the Kellogg family trust were outraged at the low sales price and commenced to sue Howard for betraying his fiduciary responsibilities to the other beneficial owners. Although Howard was exonerated by the New York State Supreme Court, his decision created permanent dissention within the family. The tensions generated by the family squabble and the uncertainty concerning the company's future in Royal Little's hands caused the departure of over fifty experienced employees by late 1961. Textron rapidly consolidated power, further eliminating experienced Buffalo executives and other employees. The final blow occurred when Textron forced the Spencer Kellogg & Sons company headquarters out of Buffalo and moved the operations to Providence, eradicating any lingering Kellogg influence. Only a subsidiary office and the research facility remained in Buffalo.[26]

Further Textron reorganization gave the highly respected research facility in the nearby suburb of Cheektowaga to NL Industries in an 1985 sale. NL closed the downtown office the next year and, in 1989, sold the entire research division to Reichhold Chemicals, Inc., a subsidiary of D.I.C. Corporation of Tokyo. In November, 1990, the entire research operation was moved from Western New York and relocated to Raleigh, North Carolina. This last move definitively ended all SK&S presence in the city where it had once been a powerhouse of local and even global proportions.[27]

The Kellogg Elevator did not fare as poorly as its parent company, however. Meyer Malting did not persist for long; the company had internal problems, and the elevator was sold to Schaefer Brewing in December, 1961. Schaefer ran the facility for a number of years until its own fortunes waned. The elevator, purchased in 1985 by St. Mary's Cement, survived as an active facility. The area's interest in preserving the facility was revealed in a county low-interest development loan given to St. Mary's by the Erie County Industrial Development Agency, which underwrote expansion and improvements to the facility to

abet its conversion.[28] The Kellogg Elevator, once the centerpiece of a global enterprise, operates today as a cement storage facility, thereby escaping the abandonment characteristic of too many Buffalo grain elevators.

MATERIALS HANDLING: HISTORY AND DESCRIPTION

Receiving by Water

Deep-draft vessels carrying flaxseed or other grain cargoes from the lakehead were accommodated in a slip extending west off the Buffalo River. The 104'-wide slip was long enough to berth ships up to 525'. As the size of grain carriers increased, this limitation became more restrictive.[29] Two movable marine towers for unloading vessels were situated on a 26'-2" wide concrete dock adjacent to the slip. Four longitudinal walls of unreinforced concrete supported the rails upon which the towers travelled. The rails sat directly on 12" x 12" timbers embedded in the concrete. Each tower measured 32' x 22' in plan and stood approximately 150' high. The structural steel framework was originally clad in corrugated iron. The towers, anchored to an I-beam track on the roof of the elevator to enhance stability, were capable of traversing the dock at an optimal speed of 9.6' per minute.

The marine leg housed within each tower was driven by a 50 hp motor mounted on the crosshead and geared to the head pulley. In contrast with contemporary rope drive systems, this power transmission arrangement was sufficiently unusual to merit comment from the engineering press. A second 50 hp motor was provided to raise the counterweighted leg out of a vessel's hold. This hoist motor was also used for hauling the tower along the dock and, presumably, for activating the pusher arm that extended the leg out from the tower.

Grain elevated in the buckets of the marine leg discharged over the head pulley into an 800-bushel receiving garner and was weighed in a 300-bushel instore scale. The flaxseed then passed through an 800-bushel lower garner to the boot of the marine tower lofter leg for reelevation. The mobile marine towers at Kellogg appear to have been the first of their type in Buffalo to contain a lofter, though arrangements at the former Great Eastern and Dakota elevators (now demolished) remain undetermined. This design feature freed the internal house legs to perform other receiving and shipping functions more efficiently. The marine lofters measured 141' in height, had a nominal elevating capacity of 16,000 bu./hr. and were driven by 75 hp motors. From the top of the marine towers, grain could be spouted into the elevator

through V-hoppers for distribution or dropped directly through a marine outstore scale for delivery to canal barges berthed in the slip.

By about 1911 the marine towers were unloading vessels at the rate of 15,000-16,000 bu./hr. per leg. From the 1920s through the early 1960s, the nominal receiving rate remained constant at approximately 20,000 bu./hr. overall. In the mid-1960s the towers were demolished and the slip filled.[30]

Receiving by Rail

All rail traffic at the Kellogg was handled on two tracks entering the north bay of the raised basement story. This track bay contained a combined car puller and transfer table, used for spotting boxcars over the receiving pits and for shifting cars between tracks to facilitate the combination of receiving and shipping operations within a congested area. The pair of tracks at the elevator could accommodate a total of eighteen cars at one time. Two car pits equipped with manually guided power shovels were used for removing the contents of the rail cars. Instore grain was checkweighed on a special 500-bushel car receiving scale beneath the tracks before being transferred into the house.

During the 1920s and 1930s, the nominal hourly rail unloading capacity at Kellogg was listed at 2,000 bushels, equivalent to approximately two cars. This figure represented one of the lower handling rates among Buffalo's waterfront elevators of that period; only the Great Eastern and the Great Northern were noticeably slower in terms of rail receiving.

Internal Distribution: Vertical and Horizontal Handling

As of 1911 the arrangement of elevating, weighing and conveying equipment was unique among Buffalo waterfront elevators. The rooftop cupola housed conveyors on two floors; the upper belts were dedicated to shipping while the lower belts were used for distribution. The central headhouse contained two lofter legs and two sets of garners and scales, as well as the required complement of spouts.

Grain unloaded through the marine towers passed through V-hoppers at the shipping floor gallery level and then through bin floor turnspouts leading to storage or to the single receiving belt running longitudinally over the bins. From the marine towers it was possible to spout directly to all twenty main bins, the nine interior interstitials and eleven of the exterior interstitials. Reaching the nine outerspace bins located along

the South Michigan side furthest from the slip required a 40" receiving belt. This distributing conveyor was divided into two sections at the house lofters, each part serving half the bins. A single 40 hp motor drove both sections via shafting. The receiving belt in each half of the elevator featured a reversible four-pulley tripper for discharging grain. At any point along the belt, grain could be tripped into bins or spouts leading from the cupola to the exterior interstitials on the northern side.

Rail receipts presumably reached the headhouse through a short transverse conveyor or collecting hopper from the car pits to the boots of the house lofters. Each lofter was driven by an individual motor through horizontal shafting. The motors were located on the head floor. One unit was rated at 50 hp, the other at 100 hp. The larger unit performed double duty by also powering the 40" conveyor bridging the slip to a single 60,000-bushel holding tank which served the linseed processing mill after demolition of the wooden Kellogg Elevator "A". The steel bridge for this conveyor spanned 146' and crossed the slip at a height of 159', providing clearance for the marine towers and the masts of vessels. The bridge conveyor presumably transferred flaxseed reclaimed from storage via the basement belts and then reelevated. The lofters could discharge through turnheads into either of two 1,000-bushel garners situated above a pair of 500-bushel scales. Below the scales grain that had been weighed could be delivered to either lower distribution belt or to the upper shipping belts.

The Kellogg also originally possessed grain cleaners and oat clippers of undetermined type and capacity. By the 1920s partial cleaning capacity was listed as 10,000 bu./hr. The grain conditioning inventory of 1937 included a corn drier, a cleaner and oat clippers in addition to receiving separators. This array may indicate that the original preponderance of flaxseed cargoes had become more diversified as the Kellogg interests responded to altered circumstances in the grain trade as well as the increasing marginality of its Buffalo processing facility.

Shipping by Water, Rail and Vehicle

The Kellogg was constructed with an eye toward its place in New York State's expanded Barge Canal system; the elevator's materials handling systems reflected the commercial benefits that were supposed to result from long-awaited improvements in the waterways between the Great lakes and the Hudson River. The Steel Storage & Elevator Construction Company devoted particular attention to arrangements for loading barges suited to the size of the new canal. Grain could be delivered to three of these craft simultaneously through the marine towers and, apparently,

spouting at the east end of the elevator where a narrow mooring dock occupied the riverbank. For direct transfer from lake vessels to canal barges, the marine towers were equipped with outstore scales and loading spouts. Grain that had been reelevated within each tower was diverted to a 1,000-bushel garner above a scale for outstore weighing prior to loading. The tower lofters were also capable of raising grain that had been spouted into their boots from the row of storage bins adjacent to the slip; this route avoided activating the basement belts, which thus remained available for mill transfers, carloading and other operations.

The storage capacity of the principal bins was designed to equal the carrying capacity of the new canal fleet so that a barge might be conveniently loaded by emptying a single tank. In this instance, the 35,000-39,000 bushels of flaxseed which could be accommodated in the main bins were sufficient to fill a 1,000-ton steel barge. By the 1920s, Kellogg's marine loading capacity was approximately 25,000 bu./hr. Additional loading spouts may have been placed in service during the late 1930s and early 1940s. Two spouts, presumably those in the marine towers, remained in use after World War II, when the nominal hourly marine shipping rate was 20,000 bushels.

Grain drawn from storage was delivered to the boots of the house lofters by two 36" wide basement belts. As in the case of the conveyors located in the rooftop cupola, the belts below the bins were divided at the central legs. The basement belts occupied a portion of the south bay. After elevation to the headhouse and outstore weighing, grain was discharged through turnspouts onto two divided 36" belts running longitudinally through the upper floor of the cupola. Each of these shipping conveyors was driven by a 15 hp motor with power transmission via belting.

The shipping floor conveyors featured non-reversible two-pulley trippers that discharged through turnspouts on the bin floor into a maze of fixed internal spouts. Via this route rail cars were loaded in the north bay of the basement at a rate of 9,000-10,000 bu./hr. Deliveries could also be made to wagons on a roadway running into the south bay. Presumably, grain could be loaded out to barges and Welland canal boats via the basement belts, house lofters, shipping conveyors and spouting system as well as the previously-described routes through the marine towers. Some photographic and documentary evidence suggests that, perhaps as early as 1920, an additional outstore scale of 2000 bushel capacity may have been installed at the west end of the elevator along with another lofter. The exact purpose of this new equipment remains undetermined, though a 1951 photo shows a spout leading to a cylindrical tank at dockside, suggesting alteration

and expansion of the original shipping arrangements.[31]

The former Kellogg Elevator is now used for cement storage; the extent to which any original elevating, conveying or shipping apparatus survived the conversion remains undetermined.

ENDNOTES

1. The following paragraphs are based on information from a variety of sources including plans and city building permits housed in Buffalo City Hall and Sanborn Fire Insurance Maps. A technical account of the building appears in The Engineering Record, 64 (12 August 1911): 183. The Buffalo Live Wire of 1910 includes photos of construction and commentary. "Concrete Grain Elevator Built with Steel Forms," Concrete Cement Age (October 1912): 103, and (November 1916) provides sections of the loading bin. The loading elevator is featured in the American Elevator & Grain Trade, 42 (15 March 1924): 605, and 45 (15 April 1927): 588.

2. Buffalo Courier-Express, 25 November 1951, p. 14C; Buffalo and Erie County Public Library (BECPL), Scrapbooks, "Industry," Vol. 2, 373; Who Was Who, Vol. 1, pt. 2.

3. Who Was Who, Vol. 1, pt. 2; Buffalo City Directory, 1880, 1890.

4. Buffalo City Directory, 1892, 1895; Erie County Clerk (ECC), Corporations, The Spencer Kellogg Company, Box 14195, Certificate of Incorporation, February 1, 1892; Certificate of Dissolution, August 21, 1899. All Erie County Clerk documents are listed by date of document origin, not by date of filing, unless otherwise stated.

5. New York Times, 12 January 1896, p. 13; 15 January 1896, p. 7; 6 December 1898, p. 3; 11 July 1899, p. 11; Naomi Lamoreaux, The Great Merger Movement in American Business, 1895-1904 (New York: Cambridge University Press, 1985), 29, 101, 155, 182.

6. Buffalo Express, 9 May 1900, p. 6; 10 May 1900, p. 7.

7. Matthew Josephson, The Robber Barons (New York: Harvest Books, Harcourt, Brace & World, Inc., 1962), 447-48; New York Times, 24 July 1905, p. 5.

8. ECC, Corporations, Spencer Kellogg Company, Box 14195, Certificate of Incorporation, May 4, 1904; Consent of Stockholders to Mortgage, December 28, 1906.

9. Lamoreaux, The Great Merger Movement, 134-41.

10. ECC, Corporations, Spencer Kellogg Company, Box 14195, Consent to Supplement Mortgage, September 6, 1907; Consent to Reduction of Capital Stock, August 5, 1910.

11. Buffalo Live Wire, 2 (January, 1911): 108.

12. ECC, Corporations, Spencer Kellogg & Sons, Inc., Box 14218, Certificate of Incorporation, August 12, 1912; Buffalo Courier-Express, 15 November 1922, p. 6.

13. Buffalo Courier-Express, 15 November 1922, p. 6; 15 July 1934, Sec. 8, p. 1; 29 October 1943, p. 6; 27 July 1969, p. 62.

14. Buffalo City Directory, 1922, 1929, 1938, 1949, 1952, 1957.

15. Buffalo Evening News, 11 July 1962, p. 1.

16. Who's Who in New York, 1929; Who Was Who, Vol. 3.

17. BECPL, Scrapbook, "Industry," Vol. 10, p. 316, cf. Buffalo Evening News, 3 February 1940.

18. BECPL, Scrapbook, "Industry," Vol. 10, p. 316; Buffalo Courier-Express, 1 December 1946, Sec. 7, p. 1.

19. ECC, Corporations, Spencer Kellogg & Sons, Box 14218, Certificate of Incorporation (Delaware), August 16, 1940; BECPL, Scrapbook, "Industry," Vol. 2, p. 373; Buffalo Courier-Express, 1 December 1946, Sec. 7, p. 1.

20. ECC, Corporations, Spencer Kellogg & Sons, Box 14218, Certificate of Merger, August 9, 1937; Certificate of Merger, February 8, 1938; Certificate of Merger, August 16, 1940; Certificate of Extension and Change of Purpose, December 13, 1937.

21. Buffalo Evening News, 29 April 1948, p. 8; BECPL, Scrapbook, "Industry," Vol. 7, 17, 210; Buffalo Courier-Express, 25 November 1951, Sec. C, p. 16.

22. BECPL, Scrapbook, "Industry," Vol. 7, n.p.

23. BECPL, Scrapbook, "Industry," Vol. 8, p. 102.

24. BECPL, Scrapbook, "Industry," Vol. 8, 256, 337, 349.

25. Buffalo Evening News, 11 July 1962, p. 1.

26. Buffalo Evening News, 16 November 1961; 11 July 1962, p. 1.

27. Buffalo Evening News, 9 November 1990, Sec. C, p. 1.

28. ECC, Deeds, Liber 6727, December 16, 1961, p. 374; Liber 9450, May 30, 1985, p. 139; Liber 9478, August 19, 1985, p. 21.

29. By the mid-1950s, just prior to the opening of the St. Lawrence Seaway which spurred construction of a new class of 730' bulk carriers, the slip could accommodate vessels up to 504' x 56'. A Directory of Names, Pennant Numbers and Addresses of All Members of the International Ship Master's Association of the Great Lakes (n.p., 1955), 319.

30. Demolition Permit (5 July 1966). The elimination of the slip had been forecasted as early as 1954. Buffalo & Erie County Public Library (BECPL), Local History Scrapbooks, "Industry," VIII: 102 (Buffalo News, 9 April 1954).

31. BECPL Scrapbooks, "Industry," II:372 (Buffalo Times, 17 May 1936): VIII:177 (Buffalo Courier-Express, 25 November 1951).

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APPENDIX

Mainhouse

Cost:	$225,000
Foundations:	Wooden piles capped by concrete column footings arranged in three longitudinal strips; footings reinforced with transverse and longitudinal square lug bars from 1/2" - 1-1/4"; 4" floor slab on 8' of infill between footings
Basement:	Full height 19', permitting access to railroad cars; at grade; three rows of bracketed rectangular pillars rising from footings to support 6' deep basement beams in rectangular grid; beams reinforced by 17 1-1/4" lug bars, 8 trussed, 9 straight and located in the lower part of the beam Bin slab carried between all main beams except those supporting main bin hopper; straight exterior basement walls composed of panels of rusticated concrete blocks, infilling between the outer rows of basement pillars; rusticated panels pierced by upright window openings
Hoppers:	16' x 16' flat plate steel hoppers bearing on basement beams; sides of bins, mortar slab on slag concrete supported by bin slab; interspace and outerspace steel hoppers set into bin slab
Bins:	Capacity 1,000,000 bushels Main bins 10 x 2 in parallel rows, cylindrical 26'-8" in diameter, 85' deep Interspace bins 9 x 1. 20 outerspace bins, convex 1/4 circle outer wall Tangential intersections to all bins, 8' long Bin wall 8" thick; 16" at intersections Vertical reinforcing, 59 lug square lug bars on 18" centers in both main and outer bins; verticals centered 6" behind exterior face of wall Horizontal reinforcing, wired to outside of verticals; graduated rectangular smooth bars in courses; each course comprises of 3 30' lengths with 2' overlaps; outerspace bins, square lug bars in 12" courses, 17' long w/ hooked ends; hooked ends attached to separate anchor bars bent behind the main bin vertical at intersection of walls

Bin Floor: 4" concrete slab on I-beams reinforced with No. 12 expanded wire

Gallery/
Workhouse: Structural steel clad in corrugated iron

REFERENCES: Original plans and a complete set of engineering calculations are housed in Buffalo City Hall. City building permits provide dates and City Plans Book for 1909 costs of construction. An excellent technical account of the building can be found in The Engineering Record, 64 (12 August 1911): 183. The Buffalo Live Wire (1910), 108, provides photos of construction and commentary.

Loading Bin

Bin: A single free standing bin approx. 23′ in diameter, 160′ tall; terminus for shipping gallery from workhouse of main elevator, previously supported by wooden trestle
Bin walls feature lift marks, and therefore appear to have been constructed using shifting panel techniques, in which two sets of forms were lifted in turn over each other

REFERENCES: City building permit provides the date. All other details are from Sanborn Fire Insurance maps.

Loading Elevator Addition

Foundations: Bins rise directly from foundation slab

Bins: Three freestanding cylindrical bins, adjacent to single free-standing bin built in 1912
Bins 23′ in diameter and 160′ tall

REFERENCES: City building permit provides the date. All other details are from Sanborn Fire Insurance maps.

Loading Elevator Extension

Foundations: wooden piles

Basement: Full height, reinforced concrete; circular columns with tiered head (not mushroom-headed) support concrete bin slab; brick panel infill

Bins: Capacity, approx. 155,000 bushels
Main bins: 4 in 2 x 2 row; bins spread; approx. 20′ in diameter and 65′ tall
Interspace bins: single interspace created between the four main bins; the link wall between the main bins is formed of a convex exterior wall plate connecting the bins at their closest points

Workhouse: Structural steel clad in corrugated iron for shipping to adjacent railroad loading shed
Two marine shipping spouts

The complex also includes ten small freestanding steel tanks approximately 9′ in diameter and one freestanding steel tank about 20′ in diameter. All structures rose directly from the foundation slab and were located between the 1922 steel loading elevator and the freestanding concrete bins of 1912 and 1936. The date of their construction is unknown.

REFERENCES: The dates of construction are from city permits. The elevator is featured in American Elevator & Grain Trade, 42 (15 March 1924): 605 and 45 (15 April 1927): 588. The dimensions are from Sanborn Fire Insurance maps. The capacity of the total complex is stated to be 1,200,000 bushels in American Elevator & Grain Trade article of March 15, 1924; a capacity of 200,000 bushels is given for the loading elevator. The freestanding concrete bin is calculated to have a capacity of about 45,000 bushels and the 1922 elevator a capacity of 155,000 bushels.